

**Notice of Allowability**

Application No.

09/835,727

Applicant(s)

DILL ET AL.

Examiner

Ted M. Wang

Art Unit

2634

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 4/20/2005.
2. ☒ The allowed claim(s) is/are 1-11, 13-20, 23, 25-33, 35-41, 46 and 47.
3. ☒ The drawings filed on 4/20/2005 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),  
Paper No./Mail Date 06/15/2005.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

## DETAILED ACTION

### *Examiner Amendments*

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.
2. Authorization for this examiner's amendment was given in a telephone interview with Attorney William Zitelli on June 15, 2005. The application has been amended as follows:
3. In the claims:
  - In claim 1, line 7, change "the" to --- a ---, and line 19, insert --- of symbols --- after simplexes.
  - In claim 1 line 7, claim 11 line 14, claim 25 line 10, claim 46 line 9, and claim 47 line 9, after ":", insert --- wherein a simplex is a set of M signals in an N-dimensional space with  $N \geq M-1$ , satisfying that for all  $i, j \in \{1, 2, \dots, M\}$ , the cross-correlation between signals  $s_i$  and  $s_j$  is

$$s_i \bullet s_j = \begin{cases} 1, & i = j \\ -1/(M-1), & i \neq j \end{cases}$$

for normalized signal energy. The M signals have equal distance from each other. ---

Art Unit: 2634

- In claim 1, line 8, insert --- (butterflies) --- after "butterfly structures".
- In claim 6, line 4, change "the" to --- a ---, line 6, change "set<sub>j</sub>" to --- set j ---, line 10, change "set<sub>k</sub>" to --- set k ---.
- In claim 8, line 2, delete "the".
- In claim 11, lines 7, 11, and 13, insert --- circular --- before "trellis", respectively.
- In claim 11, line 8, replace "the" to --- said --- after "renders", line 9, insert --- storing --- after "first", and line 19, delete "the" after "decoding".
- In claim 14, line 5, insert --- storing --- after "second", lines 6 -9, insert --- circular --- before "trellis", respectively.
- In claim 16, line 3, insert --- circular --- before "trellis".
- In claim 25, line 6, replace "the" to --- said --- after "renders", line 8, insert --- storing --- after "first", and lines 6, 10, and 12, insert --- circular --- before "trellis", respectively.
- In claim 27, line 4, insert --- storing --- after "second", and lines 5-8, insert --- circular --- before "trellis", respectively.
- In claim 29, line 2, insert --- circular --- before "trellis".
- In claim 30, line 3, insert --- circular --- before "trellis".
- In claim 33, line 7, replace "the" to --- said --- after "renders", and lines 7, 10, and 11, insert --- circular --- before "trellis", respectively.

Art Unit: 2634

- In claim 33, line 12, replace "." with --- wherein a simplex is a set of M signals in an N-dimensional space with  $N \geq M-1$ , satisfying that for all  $i, j \in \{1, 2, \dots, M\}$ , the cross-correlation between signals  $s_i$  and  $s_j$  is

$$s_i \bullet s_j = \begin{cases} 1, & i = j \\ -1/(M-1), & i \neq j \end{cases}$$

for normalized signal energy. The M signals have equal distance from each other. ---

- In claim 36, lines 7-9, insert --- circular --- before "trellis", respectively.
- In claim 38, line 2, insert --- circular --- before "trellis".
- In claim 46, line 7, insert --- circular --- before "trellis", and line 8, replace "the" to --- said --- before "path".
- In claim 47, line 7, insert --- circular --- before "trellis", and line 8, replace "the" to --- said --- before "path".

### ***Allowable Subject Matter***

4. Claims 1-11, 13-20, 23, 25-33, 35-41, 46, and 47 are allowed.
5. The following is an examiner's statement of reasons for allowance.
  - The prior art fails to teach an apparatus of Claims 1, 11, 25, 33, 46, and 47 that specifically comprises the following:
    - The instant application is deemed to be directed to a non-obvious improvement over the invention patented in Pat. No. 5,721,746,

Art Unit: 2634

5,675,590, Dissertation of Yung-Cheng Lo, entitled "Circular Trellis-coded Modulation In Spread Spectrum Communications", Ohio University, August 1997. The improvement comprises that a) identifying simplex-transition sets of originating and next states for each stage  $i$  of the circular trellis; b) determining butterfly structures associated with the identified simplex-transition sets wherein the originating and next states of said simplex-transition sets are arranged in an internal order within said butterfly structures; c) aligning said butterfly structures into a multi-dimensional state transition matrix (STM) in a predetermined order; as recited.

6. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ted M. Wang whose telephone number is (571) 272-3053. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571) 272-3056. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Art Unit: 2634

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

Ted M Wang

Examiner

Art Unit 2634

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